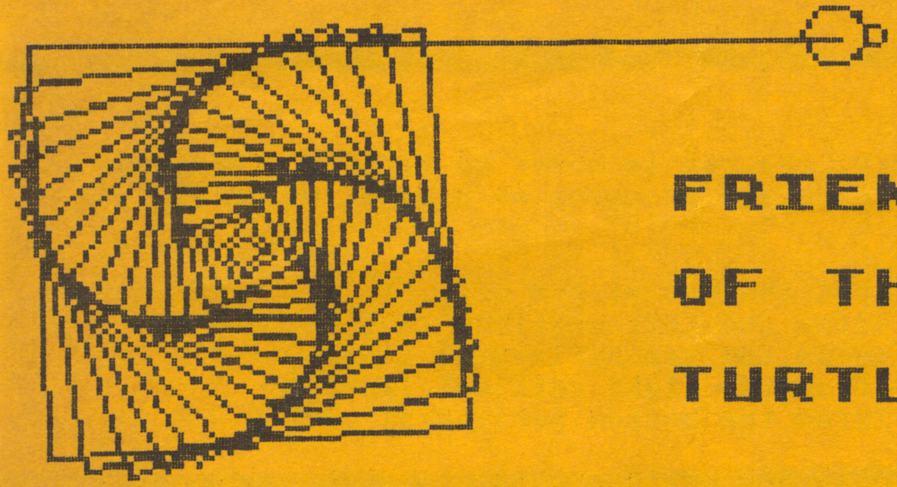

FRIENDS OF THE TURTLE

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P. O. BOX 1317
LOS ALTOS, CA 94022

Welcome to Friends of the Turtle. The goal of this society is to promote the type of computer graphics and robot environment that uses what is called "turtle geometry".

Turtle geometry encourages exploration. It can be learned by first time computer users of almost any age, and its power is so great that it can keep full-fledged computer experts engrossed for years. The turtle is a graphics tool that makes it easy for you to get the computer to do what you want it to do.

Members of our society share programs that illustrate many interesting ideas and developments in this field. Most of all, we will share beautiful designs that have come out of this computer environment.

Background - What is a Turtle?

If you have ever played with a Milton Bradley Big Trak, or used computer languages like Atari PILOT, LOGO, or WSFN, you have encountered a very special device called a turtle. Basically, a turtle is a "robot" that can move around the floor (or display screen) in response to messages you send it. Display turtles often have "pens" with which they can leave traces of their path as they move.

The difference between turtle graphics and conventional coordinate graphics can be demonstrated by drawing a square in both systems.

In coordinate geometry, the pen is moved to various coordinates on a grid. To draw a square 40 units on a side, we could use these five steps:

```
GOTO 0,0              (put the pen at the origin)
DRAWTO 0,40           (draw the left vertical line)
DRAWTO 40,40          (draw the top horizontal line)
DRAWTO 40,0           (draw the right vertical line)
DRAWTO 0,0            (draw the bottom horizontal line)
```

Next, let's see how a square would be drawn in turtle geometry. We make the turtle draw lines by giving a sequence of instructions like this:

```
REPEAT 4              (repeat the following commands 4 times)
   FORWARD 40         (draw a line 40 units long)
   RIGHT 90           (turn 90 degrees to the right)
```

While the turtle commands that draw a square are much simpler than the commands in coordinate geometry, this is far from being their only power. The coordinate representation we showed only describes a square with vertical and horizontal sides. Suppose you wanted to draw a square tilted at some angle (say 30 degrees). How would you draw that in coordinate geometry?

In turtle geometry, the description of one square is just the same as that for any other square, independent of its orientation. To draw a square tilted at 30 degrees, you first must turn the turtle by 30 degrees before having it draw the square. The commands look like this:

```
RIGHT 30
REPEAT 4
   FORWARD 40
   RIGHT 90
```

Why did we form Friends of the Turtle?

To the extent that the turtle graphics environments on various personal computers are similar to each other, Friends of the Turtle will be a place where we can explore the turtle world in a machine independent fashion. We will describe all sorts of interesting experiments to do with turtles (since experimenting is probably the best way to learn geometry anyway), share our programs, provide a "Rosetta Stone" for various dialects of turtle languages, keep track of recent developments in the field, and generally have a good time. This last point is the most important, since the turtle is a marvelous device with which to play.

Resource List

From time to time, we will publish updates of books, languages, and organizations which incorporate and/or describe turtle geometry. As you look at this list, you might find that we have left some important references out - please let us know what is missing! In the meantime, here is a beginning list to get you started.

Books:

Mindstorms: Children, Computers, and Powerful Ideas by Seymour Papert (Basic Books, 1980).

Turtle Geometry: The Computer as a Medium for Exploring Mathematics, by Harold Abelson and Andrea diSessa (MIT Press, 1981).

Picture This! PILOT Turtle Geometry: An Introduction to Computer Graphics for Kids of all Ages, David Thornburg (Addison Wesley, 1982).

Computer Languages and Products:

Big Trak (programmable robot vehicle from Milton Bradley)

Atari PILOT (language cartridge for Atari 400 and 800 from Atari)

TI LOGO (language cartridge for the TI 99/4 and 99/4A from Texas Instruments)

WSFN (language disk or tape for the Atari 400 and 800 from Atari Program Exchange)

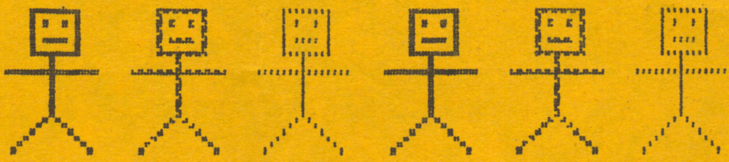
WSFN (Language tape for the Commodore PET from Peninsula School Computer Project, Peninsula Way, Menlo Park, CA 94025)

Organizations:

Young People's LOGO Association
1208 Hillsdale Drive
Richardson, TX 75081

Friends of the Turtle
P. O. Box 1317
Los Altos, CA 94022

Illustrations from *Picture This! PILOT Turtle Geometry* by David Thornburg (Addison Wesley, 1982).



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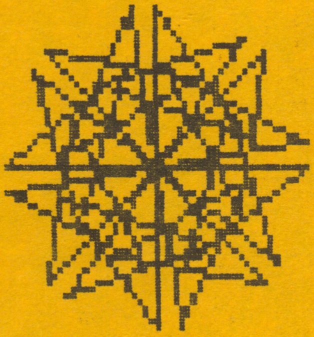

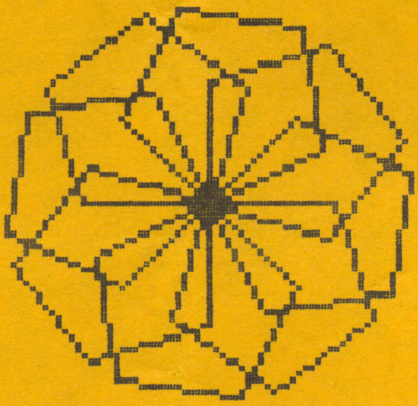

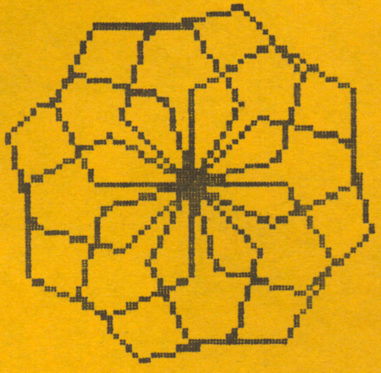

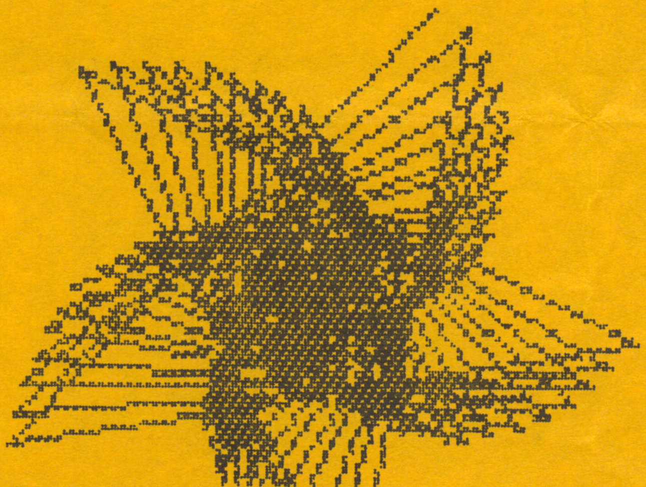

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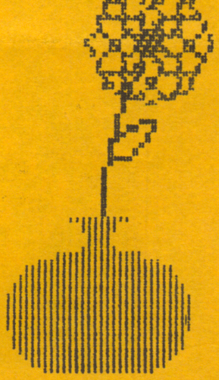

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